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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/075,602	02/15/2002	Jeffrey Hung	015290-592	1155

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EXAMINER

UMEZ ERONINI, LYNETTE T

ART UNIT

PAPER NUMBER

1765

DATE MAILED: 12/05/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s) CH 1	
	10/075,602	HUNG ET AL	
	Examiner	Art Unit	
	Lynette T. Umez-Eronini	1765	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 September 2002.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 14-27 is/are pending in the application.
- 4a) Of the above claim(s) 22-27 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 14-21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

This communication is responsive to applicant's response filed, September 19, 2002.

Newly submitted claims 22-27 are directed to an invention that is independent or distinct from the invention originally claimed for the following reasons: Unlike the original examined claims, which are drawn to a plasma etching gas formulation, the newly submitted claims are drawn to an apparatus. Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claims 22-27 are withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

Claim Rejections - 35 USC § 112

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claim 17 is rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

In claim 17, "an oxygen-free plasma etching gas formulation, which consists essentially of CH₃, Ar, and Cl₂, wherein the gas formulation has a . . . photoresist

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disposed on the organic ARC" introduces new matter because the essential components of the gas formulation is not supported in the Specification.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 19 and 20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 19, line 2, "wherein a patterned photoresist is disposed on the organic ARC"; and

In claim 20, "wherein the photoresist has a thickness of around 7000-8000 Å" is indefinite for failing to limit the claimed invention, which is drawn to an etching formulation and because the metes and bounds of the claim cannot be readily ascertained.

Claim 20 recites the limitation "... the photoresist ..." in line 2, lacks antecedent basis.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application

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by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) do not apply to the examination of this application as the application being examined was not (1) filed on or after November 29, 2000, or (2) voluntarily published under 35 U.S.C. 122(b). Therefore, this application is examined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

6. Claims 14-16 and 19 are rejected under 35 U.S.C. 102(e) as being anticipated by Abraham (US 6,004,884).

Abraham shows an example of a first chemistry $\text{Cl}_2/\text{Ar}/\text{CHF}_3$ etch of a wafer in a plasma reactor (column 10, lines 33-36) which reads on,

an oxygen-free plasma etching gas formulation comprising one or more fluorine-containing compounds, an optional inert carrier gas and chlorine, the gas formulation being free of SF_6 , in **claim 14**. It is noted that Abraham fails to explicitly teach "an optional inert carrier and chlorine" gas, but the claim does not require it. No patentable weight is given to the phrase, "for removing an organic ARC on a metallic layer." Likewise the intended use of composition is not patentably significant. *In re Albertson* 141 USPQ 730 (CCPA 1964); *In re Heck* 114 USPQ 161 (CCPA 1957).

Abraham further teaches, wherein the one or more fluorine-containing compounds is CHF_3 and the inert carrier gas is argon (column 10, lines 33-36), in **claim 15**; and wherein the one or more fluorine-containing compounds is selected from the group consisting of CF_4 , CHF_3 , C_2F_6 , C_2F_2 , and C_nF_{n+4} , (column 10, lines 33-36), in **claim 16**.

Abraham shows an example of a first chemistry $\text{Cl}_2/\text{Ar}/\text{CHF}_3$ etch of a wafer in a plasma reactor (column 10, lines 33-36).

Since Abraham teaches the same etching composition as that of the claimed invention, then using Abraham's composition, reads on, an oxygen-free plasma etching gas formulation, which consists essentially of CHF_3 , Ar, Cl_2 , and would inherently result in wherein the gas formulation has a composition effective to remove an organic ARC disposed on a metallic layer while minimally affecting a pattern of a photoresist disposed on the organic ARC, as in **claim 17**; and

Again, since Abraham teaches the same etching composition as that of the claimed invention, then using Abraham's composition reads on the gas formulation that has a composition of one or more fluorine-containing compounds, inert carrier gas, and chlorine and would inherently result in chlorine effective to remove the organic ARC minimally affecting the pattern of the photoresist, as in **claim 19**

Claim Rejections – 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Abraham (US '884) as applied to claim 15 above, and further in view of Harshbarger et al. (US 4,208,241).

Abraham differs in failing to specify the ratio of the flow rates of CHF₃:argon:chlorine is 5 to 80:5 to 80:5 to 60, in claim 18.

Harshbarger teaches etch gas composition and inlet flow rate that typically ranges for flow rate is 10-500 sccm are parameters that are subject to control in (plasma) reactors (column 8, lines 17-21). Harshbarger's flow rate which ranges from 10-500 sccm shows that the flow rate of an etch gas composition is variable.

It is the examiner's position that it would have been obvious to one having ordinary skill in the art at the time of the claimed invention to modify Abraham by using Harshbarger's method of varying the flow rate of an etchant gas for the purpose of obtaining a specified etch profile (See Harshbarger, column 8, lines 33-35).

9. Claim 21 is rejected under 103(a) as being unpatentable over Abraham (US '884) as applied to claim 14 above, and further in view of Westendorp et al. (US 5,565,036).

Abraham differs in failing to teach the oxygen-free plasma etching gas formulation comprises more than one fluorine-containing compound.

Westendorp teaches an etch gas such as such as chlorine, sulfur hexafluoride, hydrogen chloride, carbon tetrachloride, hydrogen bromide, carbon tetrafluoride, hexafluoroethane, nitrogen trifluoride, carbon dichloride difluoride . . . or mixtures thereof and ionizing the etch gas . . . to transform the etch gas into an etch plasma such that surfaces in contact with the etch plasma are etched (column 4, line 59 - column 5, line 25). The aforementioned reads on the oxygen-free plasma etching gas formulation comprising more than one fluorine-containing compound.

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It is the examiner's position that it would have been obvious to one having ordinary skill in the art at the time of the claimed invention to modify Abraham by using an etching plasma gas formulation comprising more than one fluorine-containing compound for the purpose of improving systems that exposes samples to reactive plasma (Westendorp, see Abstract).

Conclusion

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).


A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lynette T. Umez-Eronini whose telephone number is 703-306-9074. The examiner is normally unavailable on the First Friday.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Benjamin Utech can be reached on 703-308-3836. The fax phone numbers for the organization where this application or proceeding is assigned are 703-972-9310 for regular communications and 703-972-9311 for After Final communications.

ltue
November 27, 2002



ROBERT KUNEMUND
PRIMARY EXAMINER